

# Synthesis

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## PHONIC TUTOR SOFTWARE FOR VISUALLY DYSLEXIC CHILDREN



Practices and Challenges of Municipal Solid Waste  
in Malaysia

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Familial Vasopressin-sensitive ACTH-independent  
Macronodular Adrenal Hyperplasia (VPs-AIMAH):  
Clinical Studies of Three Kindreds

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Sustainable Power Generation through Co-Combustion  
of Agricultural Residues with Coal in Existing Coal  
Power Plant

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Optimum Bioconversion Process of Lignocellulosic  
Biomass to Ethanol

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Concurrent Decision Making at the Conceptual  
Design Stage Using Analytical Hierarchy

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*Orthosiphon stamineus*: A Potential New Remedy for Gastropathy

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- Organic Solvent Stable Lipase from *Staphylococcus epidermidis* AT2

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Synthesis is the only quarterly R&D&C bulletin of Universiti Putra Malaysia published in March, June, September and December. It focusses on award-winning innovations and high impact publications. It covers research happenings that emerge from the various faculties and institutes across the university and provides a brief summary of some of the important research findings by UPM. It features special topics that are of national interest in various fields and disciplines.

Scientists must be made aware of the impact of their work and its possible applications to the society and public. It is hoped that this bulletin will provide the opportunity to interact, particularly through feedback or direct mail, with the scientists from either the private sector or other government research institutions.

## Readership

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# Expensive and Late Delivery: Perception or Real?

The challenge with this new post (as a Director) is to look into the issue in which people commented that it costs more and takes longer if they ask the Development and Asset Management Office (PPPA) to carry out a project. I would have to scrutinize every aspect to find possibility reasons of such comments. I, for one, believe everything happens for a reason. In this case, I keep on wondering 'why me?' and I found the answer from the verse of the Quran: "And say: "Work (righteousness): Soon will Allah observe your work, and His Messenger, and the Believers: Soon will ye be brought back to the knower of what is hidden and what is open: then will He show you the truth of all that ye did." (At-Taubah:105)

Let me bring you through the flow of our procedure in the Development and Asset Management Office:  
 – request from PTJ (Responsible Centres) > a team to conduct feasibility study where a technical team will be sent to carry out site investigation on different aspects i.e. electrical, mechanical, civil and structure > architect to draw > QS to estimate > a committee meeting to vet through the specifications involved and tender documents > advertise > evaluates and reports > JKTS (PPPA) > Tender Board meeting > contractor awarded > LO > LA > guarantee from the bank > Site possession and contract documents > work is being carried out > monitoring > completion > DLP > Final account

The pricing of the materials used is done based on the Public Work Department guidelines. I have to admit, it is on the high side. At the same time, costing of preliminary items is also incorporated which may include the cost of hoarding, insurance and so on. Another 15% of the cost is also added as profit margin and another small percentage is allocated as contingency. A PTJ probably obtains merely the construction cost from various parties but PPPA will always estimate the overall development cost.

The main concern in preparing the tender documents is to make it as accurate as possible so as to avoid variation during the work itself. In most cases, variation leads to higher cost. However, it may be unavoidable due to hidden and buried services and structures under the ground, inside the wall or above the ceiling. Inaccurate specifications also lead to diverse interpretations which become a reason for not getting what we actually want. The whole process has to be completed by a limited number of staff since they are also involved in other maintenance and repair jobs.

A PTJ also contributes to the delay. Sometimes, the PTJ cannot decide on the scope and at times keep changing the scope of work whereby this causes the delay of the tender document to be finalized. The scope defined by the PTJ also determines the cost. At the same time, once it is under construction, we are facing another challenge i.e. to manage different sort of contractors, many of which have management problems (including financial) and limited experience.

In general, the lengthy process, detailed documentations together with indecisiveness and skimpy staff contribute towards a longer respond time to a request. PPPA is going to follow a stricter timeline so that a project can be kicked-off in a reasonably acceptable time. Simultaneously the quality of the contractors will be looked at in greater details.

PPPA is a new training and learning ground for me and I am still learning. As of now, higher cost and longer time is real for various reasons which many of them are valid. I am yet to establish more reasons that can be avoided to lower the cost and to find ways to make it quicker. Suggestions and recommendations are always welcomed.



**Samsul Bahari**

Director (Asset Management and Development Office)



# Phonic Tutor Software for Visually Dyslexic Children

Since 2004, the Ministry of Education realised the importance of providing specific learning for dyslexic children and later started the “Program Rintis Bermasalah Pembelajaran Spesifik Disleksia” (Pioneer Programme for Specific Learning Difficulties of Dyslexia) in 30 primary schools throughout the country. The majority of the dyslexic students have problems in spelling, reading and writing, thus restricting them from competing with other normal children.

It was estimated that 4.2% of the student population in every school in Malaysia are dyslexic. (Head of dyslexia, Special Education Unit, Ministry of Education 2010) and it has been estimated that 600,000 children in Malaysia are dyslexic (President, Dyslexia Association Malaysia). Our software will assist the children with 6 steps for reading and writing according to Orton-Gillingham Phonogram based on the Levinson Theory (1994) of nine mistakes in spelling, reading and writing.

The technology is a phonic tutor software that helps visually impaired dyslexic students to learn. The technology is also known as the “Phonic Tutor Software for Visual Dyslexic Children®”.

The Orton-Gillingham approach is a direct and multisensory structured, phonetic approach to teaching reading, writing and spelling with a focus on: Phonemic Awareness, Phonics, Vocabulary Development, Fluency and Comprehension Strategies. This multi-sensory, structured language approach has improved the lives and learning process of dyslexic students for more than 70 years and has been validated by studies by the National Institute of Health and numerous universities. For many children, a sustained exposure to this approach of learning has diminished or eliminated notable reading and writing problems.

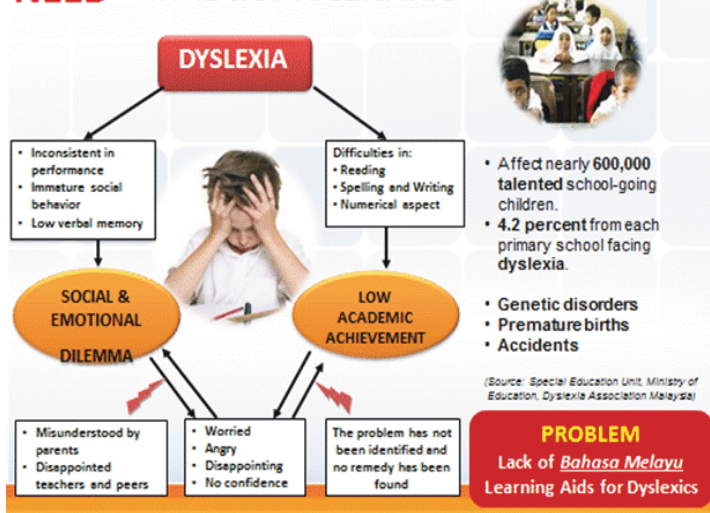
## Expert's Snapshots

Dr. Vijayaletchumy currently is an Associate Professor at the Malay Language Department, Faculty of Modern Languages and Communication, Universiti Putra Malaysia. She was a former trainee teacher from Kinta Teacher's Training College. She was awarded the Bachelor's degree in Malay Linguistics in 1998 (Universiti Putra Malaysia) and persuaded her Master's degree in the Faculty of Modern Languages in the field of Malay Language (Universiti Putra Malaysia, 2000). Her keen interest in the reading disability among primary school children motivated her to do a research

on reading disability among dyslexic children at the doctorate level. In 2003, she was awarded Doctor of Philosophy (Ph.D) in the field of Psycholinguistics. Her international research on “Language Transfer as diffusion of Cultural Norms in Linear and Nonlinear Texts” was funded by ALTRAONE, LLC. Her national level researches comprised Evaluation of Road Safety Education Program in Primary - Schools in Malaysia (2007 – 2010) was funded by the Ministry of Transport Malaysia, Teaching of Science and Mathematics in English in Primary and Secondary schools (2009) was funded by the government of Malaysia and Interactive

Software of Phonic Tutor for Zero Reading Inability was funded by Psycholinguistics Society of Malaysia. She had successfully presented her research findings on dyslexia in conferences and local journals.

## NEED MALAYSIA SCENARIO



## APPROACH



The Phonic Tutor Software for Visual Dyslexic Students is specially developed for dyslexic students and also for preschool children. Below are the summary of the product contents that will be emphasized in the product that applies the Six Important Steps for Spelling:

#### Step 1

This step is to avoid confusion that occurs among dyslexic students by introducing consonant and vocal letters. It is also to show them the differences between the letters that have similar shapes such as b-d, c-e, u-n, m-w and many more.

#### Step 2

At this part, students will start to learn to read. The different colours in the letters have been proven to help the children pick-up faster and memorise words comprehensively.

#### Step 3

This step is to prevent the students from committing to one of the Levinson Theory (1994) mistakes which is 'penggantian' (replacement) whereby at this step, the students will learn to spell and read 'suku kata terbuka' (open syllable).

#### Step 4

This step will teach the students to read the combination of consonant-vocal-consonant words which will eventually prevent the students from putting new words that is not in the sentence (penyisipan).

#### Step 5

At this stage, students will try to read consonant-vocal words that are more complex so that this kind of approach will automatically enhance their basic reading skills.

#### Step 6

A simple paragraph will be provided to the students. The students are required to read the paragraph while the teacher records the duration of the reading. Then they are asked to mark all the wrong words so that the students will read the wrong parts over and over again.

Last but not least, the students need to be encouraged for each and every achievement that they have acquired. Therefore, as a boost to their achievement, at the end of each step, students will get compliment stickers or pictures telling them that they have done a good job.

Overall, Phonic Tutor Software for Dyslexic Children is a long-term profitable product that contributes to the nation's education enhancement. With the right progression under Braineo Solution Sdn. Bhd., it is undeniable that this product will grow and develop to be the leader in the education industry.



## COMPETITOR ANALYSIS

Price comparison NeoLexic vs Product B  
Single user: RM 720 vs RM1500 (>50% savings)

PRODUCT FEATURES	NeoLexic	PRODUCT A (Local)	PRODUCT B (Global)
USER FRIENDLY	YES	YES	YES
SOFTWARE CD	YES	YES	YES
AFFORDABLE PRICE	YES	YES	NO
INTERACTIVE & ATTRACTIVE	YES	YES	NO
BAHASA MELAYU	YES	YES	NO
MULTISENSORY	YES	NO	NO
ORTON-GILLINGHAM	YES	NO	NO
DIAGNOSTIC TOOL	YES	NO	NO
MODULE	YES	NO	YES
ACTIVITY-BASED	NO	YES	YES

## Related Awards

**GOLD** Malaysia Technology Expo (MTE 2012)

**GOLD** International Invention, Innovation and Technology Exhibition (ITEX 2011)

**GOLD** International Exposition of Research and Innovation of Institutions of Higher Learning (PECIPTA 2011)

**Special Award – World Intellectual Property Organization (WIPO 2011)**

## Reader Enquiry

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# Practices and Challenges of Municipal Solid Waste Management in Malaysia

Title : [Municipal Solid Waste Management in Malaysia](#)  
 Author(s) : **Latifah Abu Manaf**, Mohd Armi Abu Samad and Nur Ilyana Mohd Zukki  
 Journal : Waste Management

Impact Factor : **2.208**

Management of municipal solid waste (MSW) has become one of the most challenging environmental issues in Malaysia due to rapid economic development and population growth, inadequate infrastructure and expertise and land scarcity. In general, the per capita generation rate is around 0.5 – 0.8 kg/person/day in which domestic waste is the primary source (Kathirvale et al. 2003). Landfilling is the only method used for the disposal of MSW in Malaysia, and most of the landfill sites are open dumping areas, which pose serious environmental and social threats. A sustainable municipal solid waste management approach should be established in order to maintain and preserve the environment for future generation. With that, a new institutional and legislative framework has been structured with the objectives to establish a holistic, integrated, and cost-effective solid waste management system, with the emphasis on environmental protection

and public health. The Ministry of Housing and Local Government, Malaysia set up the National Solid Waste Management Department as the regulatory body and the National Solid Waste Management Corporation to conduct the waste management operations. Besides that, Solid Waste and Public Cleansing Management Act, 2007 (Act 672) and Solid Waste and

that gives priority to waste minimisation through 3R, intermediate treatment and finally disposal by sanitary landfill (Ministry of Housing and Local Government, 2005). The new set up of a sustainable municipal solid waste management in Malaysia will be achieved in 2020 as Malaysia is moving towards becoming a developed country.



**Figure 1:** Workers who collect the trash everyday are working hard to clear the mess created by inconsiderate litterbugs into the garbage truck



**Figure 2:** A common sight - litterbugs leave garbage outside of the available garbage bin



**Figure 3:** Mountains of rubbish in a landfill

Public Cleansing Corporation Act, 2007 (Act 673) have also been gazetted. Selection of solid waste management options are based on the waste management hierarchy



Reader Enquiry

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# Familial Vasopressin-sensitive ACTH-independent Macronodular Adrenal Hyperplasia (VPs-AIMAH): Clinical Studies of Three Kindreds

**Title :** Familial Vasopressin-sensitive ACTH-independent Macronodular Adrenal Hyperplasia (VPs-AIMAH): Clinical Studies Three Kindreds

**Author(s) :** Lucia Gagliardi, Cheri Hotu, Graeme Casey, Wilton J. Braund, **Ling King Hwa**, Thomas Dodd, James Manavis, Peter G. Devitt, Richard Cutfield, Zbigniew Rudzki, Hamish S. Scott and David J. Torpy

**Journal :** Clinical Endocrinology

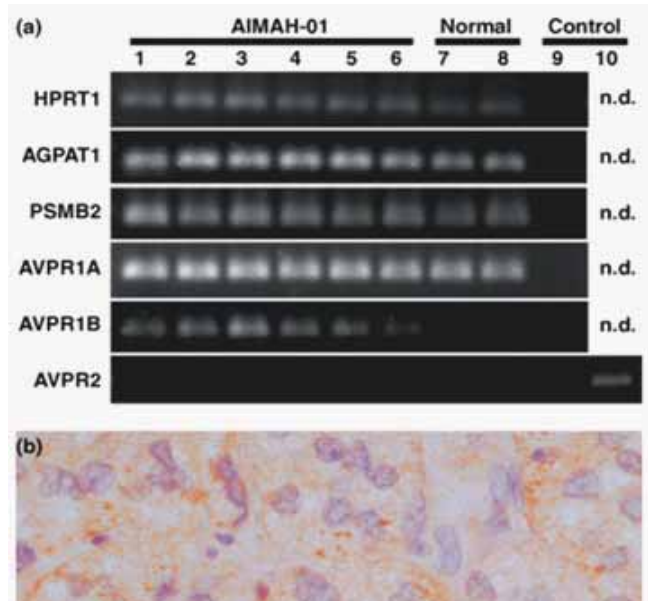
**Impact Factor :** **3.398**

Cushing's syndrome is a hormone disorder caused by prolonged exposure to high levels of cortisol hormone in the blood. Cortisol is a steroid hormone produced by the adrenal gland in response to adrenocorticotrophic hormone (ACTH), another hormone secreted by the pituitary gland. The primary function of cortisol is to help to increase the level of blood sugar. The hormone also aids in various core functions within the body such as the fat, protein and carbohydrate metabolism. The hormone also suppresses the immune system as well as decreases bone formation. There are many causes of high cortisol hormone in the blood. Exogenous administration of glucocorticoids (a class of steroid hormones) as a treatment for a variety of disorders such as asthma and rheumatoid arthritis may lead to increase level of cortisol. Endogenous derangement of the body's own system of secreting cortisol due to various medical complications such as benign pituitary adenoma, adrenal gland tumours or hyperplasia and small cell lung cancer may increase the level of cortisol in the blood.

In the article, we reported a rare incidence of ACTH-independent increased of cortisol due to macronodular adrenal hyperplasia (also known as AIMAH) that leads to Cushing's syndrome. AIMAH is not normally heritable but analysis of our kindreds showed that the disorder is heritable and most probably due to the over-manifestation of genes encoding for vasopressin receptors in the adrenal gland. Increased number of the vasopressin receptors in the adrenal gland increased the sensitivity to vasopressin, a small peptide that is released by the pituitary gland and the main function is to regulate water re-absorption in the kidney. The increased vasopressin sensitivity in the adrenal gland stimulates an aberrant increment of cortisol hormone without the influence of ACTH, a rare condition seen in patients with Cushing's syndrome.

In conclusion, AIMAH due to vasopressin sensitivity is a familial disorder. Clinical characteristics of AIMAH are age-dependent, but family screening with clinical, biochemical and radiological tests afford the

opportunity for early detection of the disease before its manifestations in individuals with immediate family members suffering from Cushing's syndrome. This may allow early treatment of Cushing's syndrome. Since the heritability of AIMAH due to vasopressin sensitivity may not be unique, we suggest that all first-degree relatives of all future AIMAH cases be assessed for potential early intervention of preclinical cases within the family. In the future, the elucidation of the genetic basis of familial AIMAH may allow genetic testing to select individuals for screening.



(a) Detection of genes encoding for vasopressin receptors (AVPR1A, AVPR1B and AVPR2 genes) in AIMAH adrenal tumours. Reference genes: HPRT1, AGPAT1, PSMB2. Lanes 1-6 = patients, Lanes 7-8 = normal, Lanes 9-10 = controls and n.d. = not determined.

(b) Immunohistochemistry staining for AVPR1A receptors in an adrenal tumour section from a patient with AIMAH.

## Reader Enquiry

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# Sustainable Power Generation through Co-Combustion of Agricultural Residues with Coal in Existing Coal Power Plant



Title : Sustainable Power Generation through Co-Combustion of Agricultural Residues with Coal in Existing Coal Power Plant

Author(s): Wan Azlina Wan Ab Karim Ghani, Reza A. Moghadam and Mohamad Amran mohd Salleh

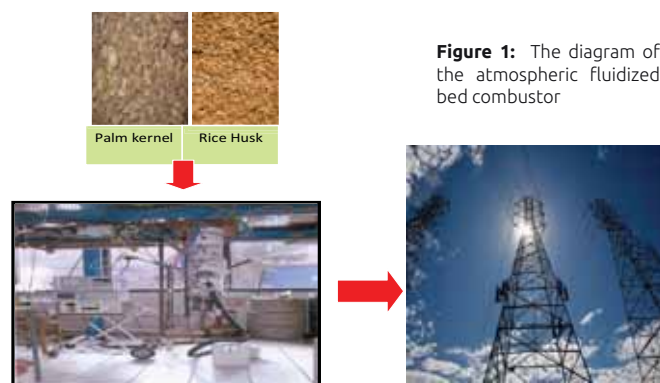
Journal : Waste Management

Impact Factor: **2.208**

Waste-to-energy is gaining increasing attention as landfill costs and environmental concerns rise in many developed countries, including Malaysia. A recent study showed that biomass in Malaysia contributes about 14% of the energy used every year—approximately 340 million barrels of oil equivalent (boe). Paddies and palm plantations are among the main contributors of waste to the biomass energy utilisation in Malaysia. The energy potential from these two resources is 16.4 and 229 picojoules, respectively, based on the production of 2194 thousand tonnes and 60,000 thousand tonnes, respectively, in 2000 (BIOGEN, 2004). This implies that an electric energy potential around 375MW can be generated. Combustion of agricultural residues is commonly used in industries for energy recovery. However, many researchers have found difficulty in achieving high efficiency with stand-alone biomass firing. Thus, cofiring biomass with coal in industrial and utility boilers could offer an alternative approach with improved combustion efficiency, lower-cost and reduced-risk technology. Significant co-combustion potential for biomass and waste materials exists in all European Union (EU) countries, and such potential is mirrored on a worldwide basis, creating a significant market for equipment and services. Fluidised bed combustion (FBC) has been shown to be a versatile technology capable of burning practically any waste combination with low emissions. The significant advantages of fluidised bed combustors over conventional combustors include their compact furnaces, simple designs, effective combustion of a wide variety of fuels, relatively uniform temperatures, and ability to reduce emissions of nitrogen oxide and sulphur dioxide gases.

In order to explain the behaviour of biomass-fired fluidised bed incinerator, biomass sources from agricultural residues (rice husk and palm kernel) were co-fired with coal in a 0.15 m diameter and 2.3 m high fluidised bed combustor. Figure 1 shows the diagram of the atmospheric fluidized bed combustor used in this investigation. The combustion of agricultural residues in an existing coal-fired boiler was evaluated in terms of combustion efficiency. Generally, the experimental results gave combustion efficiencies of 60–80% and

80–83% for the mono-combustion of rice husk and palm kernel shell, respectively. However, addition of a 50% mass fraction of coal could increase the carbon combustion efficiency up to 20% with an acceptable CO emission limit (less than 2500 ppm). Generally, the factors that influence combustion efficiency are (1) the loss of carbon in the elutriated solids, and (2) the loss of carbon as CO due to incomplete combustion. The operating parameters such as percentage of excess air, fluidising velocity and bed temperatures play an important role in the co-combustion process. Moreover, burning agricultural residue is found to be different from burning coal due to the difference in properties (i.e., particle size, nature); the differences are clearly shown in the temperature profiles and their ash content. However, from this study, the existing coal-fired fluidised bed boiler was found to be capable of burning agricultural residues with minimum modifications, such as air requirement and fluidising velocity. This is important in order to achieve high combustion efficiency during the operations.



**Figure 1:** The diagram of the atmospheric fluidized bed combustor

## Related Awards

- SILVER** UPM Invention, Research & Innovation Exhibition (PRPI 2009)
- GOLD** UPM Invention, Research & Innovation Exhibition (PRPI 2008)
- SILVER** UPM Invention, Research & Innovation Exhibition (PRPI 2007)



## Reader Enquiry

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# Optimum Bioconversion Process of Lignocellulosic Biomass to Ethanol

Large quantities of waste materials and by-products are generated from manufacturing processes, service industries and agricultural industries and hence, solid waste management has become one of the major environmental concerns in the world. Reutilization of waste materials and by-products is one of the solutions to environmental and ecological problems. Malaysia is one of the top producers of palm oil and wooden furniture in the world. Conversion of its enormous output of lignocellulosic biomass, such as oil palm residues and wood wastes generated by those industries to useful products has become an important national issue. These waste materials of lignocellulosic biomass can be considered as secondary products if there are any appropriate technological means for converting them into highly demanded and usable products.

Besides waste disposal, another great challenge in the 21<sup>st</sup> century is to meet the growing demand of petroleum as energy and feedstocks for chemical products such as pharmaceuticals, solvents, fertilizers, pesticides, and plastics. This has caused a gradual depletion of petroleum and environmental deterioration, resulting from its over consumption. Thus, there is a need to consider the use of renewable resources as an alternative for petroleum. The most ambitious conversion of these has been the conversion to alternative energy carriers and ethanol is widely known to become a sustainable transportation fuel in the near future.

Over the past 50 years, there has been a vast amount of research publication addressing the concentrated acid hydrolysis for producing glucose prior for bioethanol fermentation using *Saccharomyces cerevisiae* from various lignocellulosic materials. However, each particular lignocellulosic biomass has its own optimal treatment parameters. If Malaysia was to make use of its major abundant available lignocellulosic biomass consisting of monocotyledon such as oil palm trunk and dicotyledon such as rubberwood and mixed hardwood sawdust, there is a need to investigate the conversion efficiency and the optimum parameters for these lignocellulosic biomasses.

Unlike softwood and hardwood, oil palms are monocotyledons with trunks that are anatomically different from wood, consisting of vascular bundles and parenchyma tissues. The accessibility of the cellulose to hydrolysis with this unique physicochemical structural of oil palm trunk could be different than other woody material. Increased productivity and efficiency will drive down all the production costs and make the bioethanol from lignocellulosic biomass more attractive to replace the fuels derived from crude oil.

The present work was aimed to investigate the potential use of oil palm trunk, rubberwood sawdust and mixed hardwood sawdust as an alternative feedstock for lignocellulosic ethanol production and to evaluate the optimal treatment condition for these lignocellulosic biomasses. The most efficient ethanol fermentation conditions were determined by high yields of ethanol in the shortest fermentation time. The optimisation study of the processing parameters will contribute to the high efficiency of hydrolysis and fermentation process.

Using the same amount of feedstock, mixed hardwood produced slightly higher in volume of bioethanol (215 L/t) compared to oil palm trunk and rubberwood with the ethanol yield per tonne of 204 L/t and 206L/t, respectively.



**Figure 1:** A display that shows the optimum bioconversion process of lignocellulosic waste to ethanol

## Related Awards

- SILVER** International Exposition of Research and Innovation of Institutions of Higher Learning (PECIPTA 2011)
- GOLD** Bioinnovation Award (BioMalaysia 2010)
- SILVER** UPM Invention, Research & Innovation Exhibition (PRPI 2010)

## Reader Enquiry

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# NEWCASTLE DISEASE VACCINE V4-UPM

## Product Description

■ Newcastle disease is one of the most important poultry diseases in the world. The cost to the farmer includes: death of chickens, loss of production, cost of eradication and quarantine programs and loss of trade. This vaccine was successfully developed by cloning V4 virus, designated as V4-UPM.



## Product Benefits

- Portable and lightweight
- Can be incorporated in feed - a practical approach for mass vaccination
- Simple administration and effective vaccine
- Cheaper than imported vaccines
- Can be used to control Newcastle disease in commercial and village chickens
- Heat stable properties - advantages for tropical countries



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# FOWL POX VACCINE



## Product Description

■ Fowl pox disease is a common disease of poultry in the world. It is relatively slow-spreading and characterised by the development of proliferative skin lesions (cutaneous form) and/or upper digestive and respiratory tract lesions (diphtheritic form). The cost to the farmer includes – death of chickens, generalised infection resulting in loss of production. This vaccine was successfully developed by cloning the Beaudette strain virus and propagating it via tissue culture for the control fowl pox disease.

## Product Benefits

- vaccine is homogeneous and stable
- can be prepared in freeze-dried form
- easy long term storage
- can be used for all types of chickens

### Reader Enquiry

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## UPM LAUNCHES SERDANG BIOMASS TOWN AWARENESS CAMPAIGN

Adopting a green technology concept, it is the first project of its kind launched in Malaysia which aims to improve the disposal system of solid to organic waste in order to produce clean, quality and contamination-free air. The project is divided into four segments, namely biogas (electrical energy), biodiesel (flammable substance), bio-compost (fertilizer), and biochar (charcoal from biomass).

UPM Vice Chancellor, Dato' Ir. Radin Umar pledged the university's full commitment to support the government in creating a sustainable environment and planning proper town development in line with the university's mission.

"This project is an initiative by UPM researchers to conduct research that is based on R&D, reviewing studies on sustainable methods applied by industries for the overall transformation into environmental-friendly green technology. We believe that this campaign will further enhance the standard and quality of community life. The collaboration between UPM and MPSJ hopes to boost technology commercialisation including the manufacture of waste processing machines," he added.

The project is a collaboration of UPM, the Ministry of Housing and Local Government (KPKT), Subang Jaya Municipal Council (MPSJ) and the Malaysian Agricultural Research and Development Institute (MARDI).



A speech by Prof. Dr. Mohd Ali Hassan, Dean of the Faculty of Biotechnology and Biomolecular Sciences.

The Solid Waste Management and Public Cleansing director-general, Datuk Dr. Nadzri Yahaya revealed that about 45% food solid waste produced by the public is being disposed of without proper treatment. "Decomposing waste will result in leachate, which can pollute river water as well as underground water sources. One of the ways to establish a true biomass town is for the organic waste to be regenerated to produce energy and for other uses. A total of RM5 mil has been allocated by the government to

showcase the treatment methods such as decomposition, the use of Anaerobic Digester and the establishment of a biodiesel plant," he said.

According to Datuk Dr. Nadzri Yahaya, the government will focus on pre-disposal treatment of solid waste and at the same improve the safety of existing sanitary landfills or consider the closure of unsanitary ones.

Statistics showed that there are 176 waste disposal sites that are in operation, out of which only eight are considered sanitary, while many of the others are open dump sites without any action taken to control or treat the leachate.

Prof. Dr. Mohd Ali Hassan, the Dean of the Faculty of Biotechnology and Biomolecular Sciences, has set a target of three years to fully implement the project.

"This campaign will continue so that it can eventually convince the public of the project's effectiveness and also educate them on the importance of converting solid waste into useful organic materials. It is hoped that all parties concerned will give their full cooperation to the implementation of this project as such cooperation is most important to ensure the success of the programme," he added.

Biogas produced from solid waste can be used to generate electricity, whereas livestock waste and green waste from the community can be used for the production of bio-compost and also for converting used cooking oil into biodiesel. The local community and traders who practise food waste separation will receive free compost fertiliser. Those who recycle cooking oil will receive cash incentives equivalent to the quantity of used oil collected. Also present at the campaign

were MPSJ president, Dato' Asmawi Kasbi, Embassy of Japan representative, Shun Ogawa and Daisuke Tsujimoto of Recycle One Inc.

## UPM CHANCELLOR LAUNCHES FORESTRY EDUCATIONAL CENTRE

Sultan Sharafuddin Idris Shah, who is the Sultan of Selangor, toured all the facilities in SISFEC, which has been established as an educational reference centre. In addition, it is also a research and development centre for good practice in tropical forest management at national level and globally.

The Sultan expressed his hope that SISFEC's scientific research would make discoveries in genetic resource and continue to document not only plant stocks but also wildlife.

In his speech, the Selangor Sultan wished for the state government to amend the present memorandum of understanding with UPM concerning the forest from 80 years to 999 years. "To ensure the forest functions as a green zone, the genetic resource conservatory as well as a research and educational centre of UPM's Faculty of Forestry should remain there permanently," the Sultan added. The UPM Chancellor also urged all parties including the local residents to play their part in conservation and to report any suspicious activities that might harm the forest reserve.

Accompanying the Sultan were Malaysia's fifth Prime Minister cum Advisor to the Malaysian Landscape, Tun Abdullah Ahmad Badawi, Tun Jeanne Abdullah, Higher Education Minister, Dato' Seri Mohamed Khaled Nordin, Pro Chancellors of UPM, Tan Sri Dato' Setia Dr. Nayan Ariffin and Tan Sri Dato' Sri Lim Ah Lek, and the Dean of the Faculty of Forestry, Prof. Datin Dr. Faridah Hanum Ibrahim.

Meanwhile, the Vice Chancellor of UPM, Dato' Ir. Dr. Radin Umar in his speech mentioned that the agreement between UPM and the Selangor state government signed in 1996 granted UPM permission to manage the 1, 176.1-hectare Ayer Hitam forest reserve as a forest for educational purposes, research and for forestry development until 2076.



Sultan Sharafuddin Idris Shah plants a sapling of the *Merawan Meranti* species on the grounds of SISFEC.

## UPM WINS 6 GOLD MEDALS AT MTE 2012

The research output of UPM once again received national level recognition as researchers of UPM successfully bagged 6 gold medals, 8 silver medals and 14 bronze medals at the Malaysia Technology Expo (MTE) 2012.

A total of 29 projects were contested at the exhibition, held on the 16-18 February 2012 at the Putra World Trade Centre (PWTC) recently that comprised various clusters including Manufactured Article, Plan, Prototype and Model.

One of the gold medalists was Assoc. Prof. Dr. Vijayaletchumy Subramaniam from the Faculty of Modern Languages and Communication with her product - Phonic Tutor Software for Visually Dyslexic Children, the first ever visual software in South East Asia for dyslexic children.

The exhibition this year was different from the previous years as the main goal of the participations was not only to collect high number of medals but also to bring forward research products of researchers in UPM to be commercialised. This is in line with the theme of the exhibition this year - Moving Innovations to Market.

The exhibition also saw enthusiasm from entrepreneurs of UPM's joint venture companies in promoting and selling off their research products directly to those who came to the exhibition.



A co-researcher of Assoc. Prof. Dr. Vijayaletchumy Subramaniam, Assoc. Prof. Dr. Mokhtar Hj. Nawawi, a representative of Dr. Annie Christianus and a representative of Dr. Siti Khairunniza Bejo.

Among the products that received encouraging number of sales were UPM B10: Liquid Biofertiliser for everlasting crop production (Biofertiliser), a product of Phyto Gold Sdn. Bhd., Therapeutic Herbal Bath (Putra Aromatic), a product of Etlingera Sdn. Bhd. as well as young trees, fruit juice and fertilisers from the University Agriculture Park (TPU).

Besides that, 15 companies were interested to have research collaboration and negotiation with UPM.

As an overall, UPM was awarded second place for the Best Booth Design Bare Scheme Category presented during a dinner ceremony organised by the Malaysian Association Research Scientist (MARS) as the official organiser of MTE 2012.

Management Practice (GMP) and Food Safety Management System (FSMS) training. Dr Tai revealed that such cooperation has been agreed upon in the Memorandum of Understanding (MoU) with the aim of improving the quality of the programme, the effectiveness of industrial training and meeting industrial needs for UPM graduates.

"Both parties agreed to provide facilities and expertise in order to improve the quality of research development and innovation in this area," said Dr. Tai before signing the MoU with Dr. Samsul Bahar Sadli, the Director / Business Development Manager of DNV.

According to Dr. Samsul Bahar, several activities have been planned to provide experimental learning experience for students. "We provide analysis services and expertise exchanges for research and knowledge sharing in the food science and technology field to UPM," he revealed.



A handshake by the Deputy Vice Chancellor (Industry and Community Relations), Prof. Dr. Tai Shzee Yew and Dr. Samsul Bahar Sadli, Director/Business Development Manager of DNV to seal the MoU.

## FRSB UPM EXHIBITS 60 ARTIFACTS IN STEDEX

The Faculty of Design and Architecture (FRSB), Universiti Putra Malaysia (UPM) displayed 60 indexed exhibits relating to environmental issues and steady designs known as STEDEX' 11.

Deputy Vice Chancellor (Academic and International) UPM, Prof. Datin Paduka Dr. Aini Ideris said that as many as 540 undergraduate students were involved in the exhibition.

"Virtual publication through the Virtual Library Museum Pages (VLMP) is also expanded to ensure that each artifact receives the standard indexed quotation article status. The STEDEX'11 exhibition this time featured two advantages namely artifacts inserted into audio/visual format in VLMP," she said.

Meanwhile, Deputy Information, Communications and Culture Minister II, Datuk Maglin Dennis D'Cruz said that FRSB's efforts in featuring alternative methods in the Art and Humanities Index publication is a creative idea that will benefit and produce quality teaching and learning in design.

"This initiative increases the number of publications and research output from three groups, namely the 'Environmental Design Behavior Research Group', 'Environmental Design Technologies and System Research Group' and 'Environmental Design Integration Research Group'," he said in his opening speech. In conjunction with STEDEX, the seminar on Sustainable Tropical Environmental Design was a platform for intellectual partnership on environmental and design issues.



Deputy Information, Communications and Culture Minister II, Datuk Maglin Dennis D'Cruz going through the STEDEX'11 publication.

He also said that the approach not only introduces teaching based on theory but also exposes students to case studies based on industrial experiences.

DNV is a private organisation that provides services on how to address risks and protect life, property and environment. Furthermore, the management quality aspects, operational excellences, corporate responsibility and management of security, health, food safety, environment and energy are included in the DNV portfolio.

## UPM INNOVATION IN 'MALAYSIAN INNOVATORS'

UPM vaccine research on Newcastle Disease Vaccine (NDV4-UPM Vaccine) has been included in the book, "Malaysian Innovators – Everyone can Innovate". The innovation is a research by UPM Deputy Vice Chancellor (Academic & International), Prof. Datin Paduka Dr. Aini Ideris and Prof. Emeritus Dato' Dr. Abdul Latif Ibrahim. Prior to this, in October 2010, Prof. Datin Paduka Dr. Aini received the Product Innovation and Commercialization Award at the National Academic Awards (NAA).



Dato' Mukhriz Tun Mahathir, Deputy Minister of International Trade and Industry going through the book with Prof. Datin Paduka Dr. Aini Ideris.

This second publication by the Malaysian Productivity Corporation (MPC) and Malaysian Association of Creativity & Innovation (MARCI), records the efforts of enterprise pioneers, researchers and youth in order to show that innovative products from Malaysia can be internationalised.

Deputy Minister of International Trade and Industry, Dato' Mukhriz Tun Mahathir, who launched the book, said the initiative by MPC is an opportunity for the researchers to share their experiences with readers. "Researches done by individuals and organisations which have been included in this book will inspire readers to be innovative and forward-looking," said Dato' Mukhriz. Also present at the MPC CreaNova 2012: Power of Collaborative Innovation event was MPC Chairman, Tan Sri Azman Hashim.

Other innovations included in this book are five from public institutions of higher learning (IPTAs), one from a research institute, three from the small and medium enterprise (SME) sector and seven from secondary schools that developed the commercialisation of products, patents, industry designs, trademarks, and copyrights.

## ENHANCING FOOD SCIENCE AND TECHNOLOGY RESEARCH QUALITY OF UPM

The Faculty of Food Technology (FTSM), Universiti Putra Malaysia (UPM), in collaboration with Det Norske Veritas Pte. Bhd. (DNV) company is taking steps to further improve the research quality of food science and technology.

The Deputy Vice Chancellor (Industry and Community Development), Assoc. Prof. Dr. Tai Shzee Yew said the collaboration was through the International Organisation for Standardization (ISO), Good

# Concurrent Decision Making at the Conceptual Design Stage Using Analytical Hierarchy

Concurrent engineering (CE) is a concept that allows product designers to integrate various design activities at the early stage of the design process. There are two design activities that can be integrated in order to allow concurrent decisions during the development process. They are the design concept selection and materials selection process. The success of product performance is based on appropriate decisions on material and design concepts during the development process. Inappropriate decisions on design concepts and materials always lead to huge cost involvement and ultimately drive towards premature component or product failure.

To overcome this problem, concurrent engineering (CE) is an approach which allows designers to consider early decision making and integrate various design activities that need to be implemented. To illustrate the use of concurrent engineering approaches at the early stage of the design process, a concept selection model called concurrent design concept selection and materials selection (CDCSMS) is proposed. The proposed concept is as a framework to illustrate the concurrent decision making by integrating analytical hierarchy process (AHP) to the selection process.

The proposed framework of the selection process is made at the conceptual design stage. The conceptual design stage comprises 3 main design activities namely concept generation, concept selection and concept development. At the concept selection stage, the decision tasks can be divided into two main parts. The first part is called the design concept selection and the second part is called the materials selection. Both of these parts are simultaneously performed by implementing analytical hierarchy process (AHP).

CDCSMS model is a framework that guides designers to evaluate and determine the best design concepts and materials simultaneously during the concept selection process at the conceptual design stage. The final decision is verified by simulating various scenarios by increasing or decreasing the values of the priorities vector of the main criteria. The purpose of performing

the sensitivity analysis is to verify the results of the decision and to study the effect of the different factors on deciding the best decision option. The final selection is highly dependent on the priority vectors attached to the main criteria.

The minor changes in the priority vectors might contribute to the major changes in the final ranking. The stability of the ranking under varying criteria weights has to be tested as these priority vectors are usually based on highly subjective judgments. Both of these decisions are then verified by performing various scenarios of sensitivity analysis by using analytical hierarchy process through utilizing the Expert Choice software. Thus, the proposed CDCSMS provides a systematic framework for designers to determine the most optimum decision concurrently on material and design concept, during concept selection at the conceptual design stage.

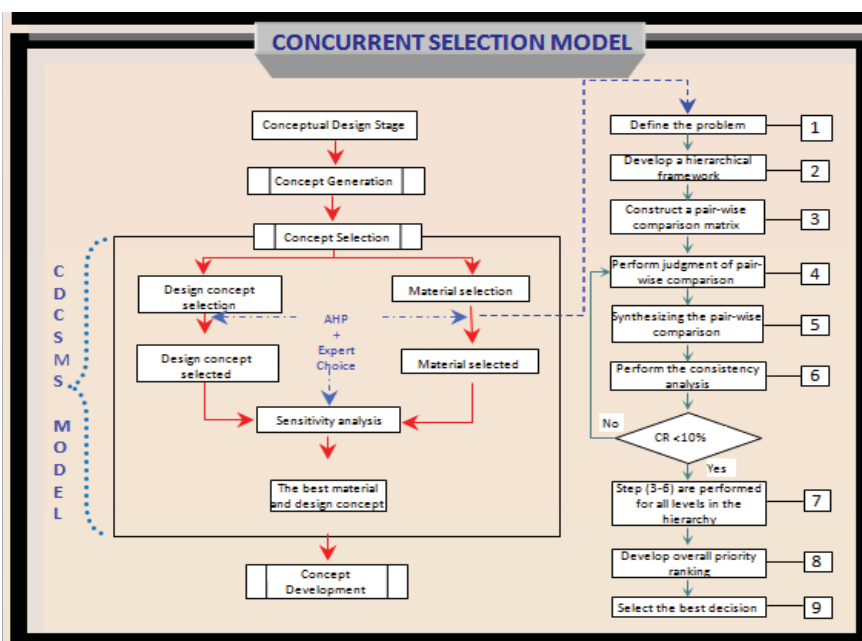


Figure 1: The proposed Concurrent Selection Model

## Related Awards

**BRONZE** Malaysia Technology Expo (MTE 2010)

**SILVER** UPM Invention, Research & Innovation Exhibition (PRPI 2009)

## Reader Enquiry

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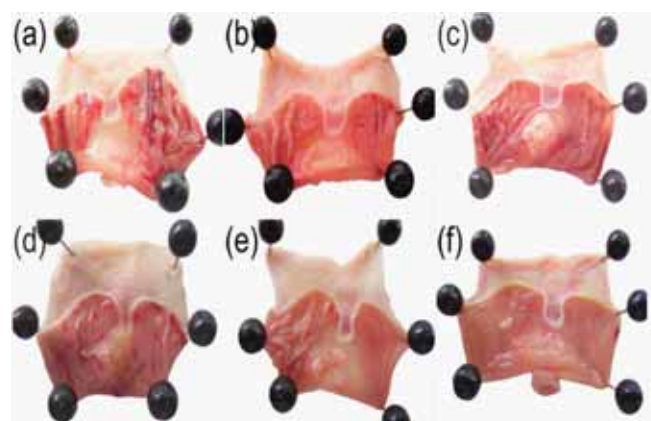


# Orthosiphon stamineus: A Potential New Remedy For Gastropathy

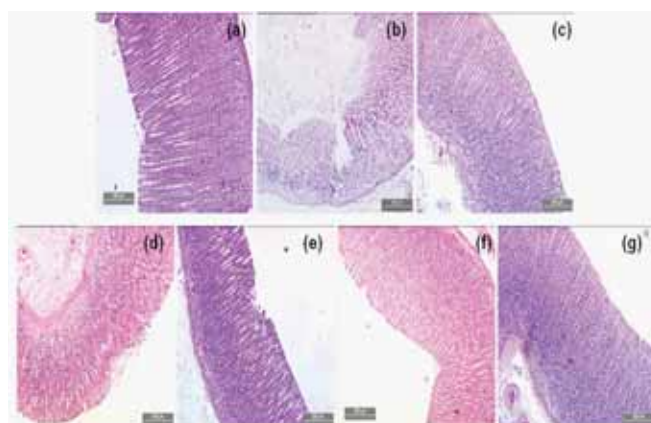
*Orthosiphon Stamineus* (*O. Stamineus*) Benth (Lamiaceae) is a shrub indigenous to various part of Malaysia. Previous phytochemical investigation of the plant has revealed the presence of terpenoid and polyphenolic compounds, which contributed to the therapeutic effects of *O. Stamineus*. Lipophilic flavonoids isolated from the plant have been shown to inhibit radical scavenging activity whereas the flavones (sinensitin and 3'-hydroxy-5,6,7,4'-tetramethoxyflavone) isolated from the members of the *O. Stamineus* genus exhibited diuretic activity.

Presently, a new phytopharmaceutical product has been formulated to contain 250 mg of *O. stamineus* extract (MET50) which is standardised to contain 20.95 mg of bioactive flavonoids. This is the first herbal based standardized extract of bioactive flavonoids targeted for gastroduodenal ulcers. This standardised extract has been characterized both with respect to the chemical constituents and the pharmacological effect. Analysis using the HPLC has revealed the presence of rosmarinic acid (7.58%), sinensitin (0.2%), eupatorin (0.34%) and 3'-hydroxy-5,6,7,4'-tetramethoxyflavone in our extract product (MET50). A study conducted in the animal model of gastropathy has proven the anti-ulcerogenic property of the extract. Histopathological findings showed that the extract was able to prevent the gastric mucosal injury induced by ethanol in the gastropathic animal model in a dose-dependent manner. Lipid peroxidation was also dose-dependently inhibited in an *in vitro* and *ex vivo* studies which basically indicated its possible mechanism in the prevention of gastric lesion induced by the ethanol. The extract can also enhance gastric mucus synthesis and secretion which further describe its protective effects on the gastric wall.

The present findings demonstrated that oral administration of *O. stamineus* extract exhibited a dose-dependent gastroprotective effect on ethanol induced gastric lesion and hence has the potential to be developed into an anti-ulcer agent.



Morphological appearance of various treatments against ethanol-induced gastric lesion: (a) distilled water (10 ml/kg), (b) omeprazole (30 mg/kg), (c) MET50 (125 mg/kg), (d) MET50 (250 mg/kg), (e) MET50 (500 mg/kg) and (f) MET50 (1000 mg/kg).



Light micrographs show the effect of MET50 on ethanol-induced gastric lesions. (a) The stomach wall of the normal group has a normal appearance. (b) Administration of ethanol produced lesions in the form of gastric pits with detachment of the surface of the epithelium, and epithelial cells appeared to be vacuolated. (d and e) Pretreatment of rats with MET50 at 125 or 250 mg/kg, respectively, partially protected against ethanol-induced lesions. (c, f, and g) Administration of Omeprazole (30 mg/kg) and MET50 (500 or 1,000 mg/kg), respectively, almost completely prevented the formation of ethanol-induced lesions.

## Related Awards

**GOLD** UPM Invention, Research & Innovation Exhibition (PRPI 2010)  
**BRONZE** BioInno Award, Biomalaysia 2010



## Reader Enquiry

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## Innovative Products in Food Processing

8 innovative products by Dr. Rosnah Shamsudin from the Department of Process and Food Engineering, Universiti Putra Malaysia were among the technologies commercialised in 2011 in the food processing field in UPM. The products were licensed to TPM Engineering focussing at small and medium industries (SMIs) in Malaysia. The products indirectly attract small time entrepreneurs especially those from rural areas who are keen to venture into the food processing field, besides diversifying food processing activities and increasing employment opportunities. This will consequently help to raise living standard and the development of Malaysian society. The products are Ezy Cooker, Coconut Auto Squeezer, Pineapple Multi-Peeler Plus, Nato De Coco Dicing Machine, Rolled Tarts, Koye Kacang Forming Machine, Shredding and Slicing Machine and Fruit Grading Machine. Information on the first two of the products are provided in this issue.

### ► EZY COOKER



Ezy Cooker is a multifunctional machine. It is designed for small scale industry. Ezy Cooker is suitable for cooking jam, chilli sauce, tomato ketchup, kaya etc. The advantages of the machine are its automatic operation of the paddle for mixing, digital temperature controller, product discharged through outlet valve, insulated mixing bowl to reduce heat losses, hygienic design, time and energy saving and multi functional machine.

Ezy Cooker uses a batch process operating system in which has two main functions: heating and mixing processes. The cooking bowl has the shape of a cylinder and it is equipped with a flexible paddle mixer for homogeneous mixing. With a capacity of 20 litres, the cooking process is controlled by a motor of 40 W with 230 V and 50/60 Hz. The performance of the machine is 8 kg/hr for the final product. The capacity of the machine can be designed in the range of 2 litres and above.



Machine Operation

### ► COCONUT AUTOSQUEEZER (PI 20084006)

Coconut Auto Squeezer is a machine designed to grate and extract coconut milk from coconut which has been removed from its shell. It is designed to achieve an efficient, hygienic, safe and easily handled operation. This machine is suitable for small scale entrepreneurs such as housewives, restaurant owners, SMEs and others. Besides saving time and energy, it also produces a higher volume of hygienically concentrated coconut milk. Traditionally, coconut milk is produced by squeezing grated coconut by hand. However, this method is not only time consuming, but the quantity and quality of coconut milk produced are low too. Coconut Auto Squeezer takes only 20 seconds to process one coconut into coconut milk. It also has no limits in the capacity of coconut that can be processed.



.....To be continued in Synthesis Issue 37, June 2012

### Reader Enquiry

Rosnah Shamsudin

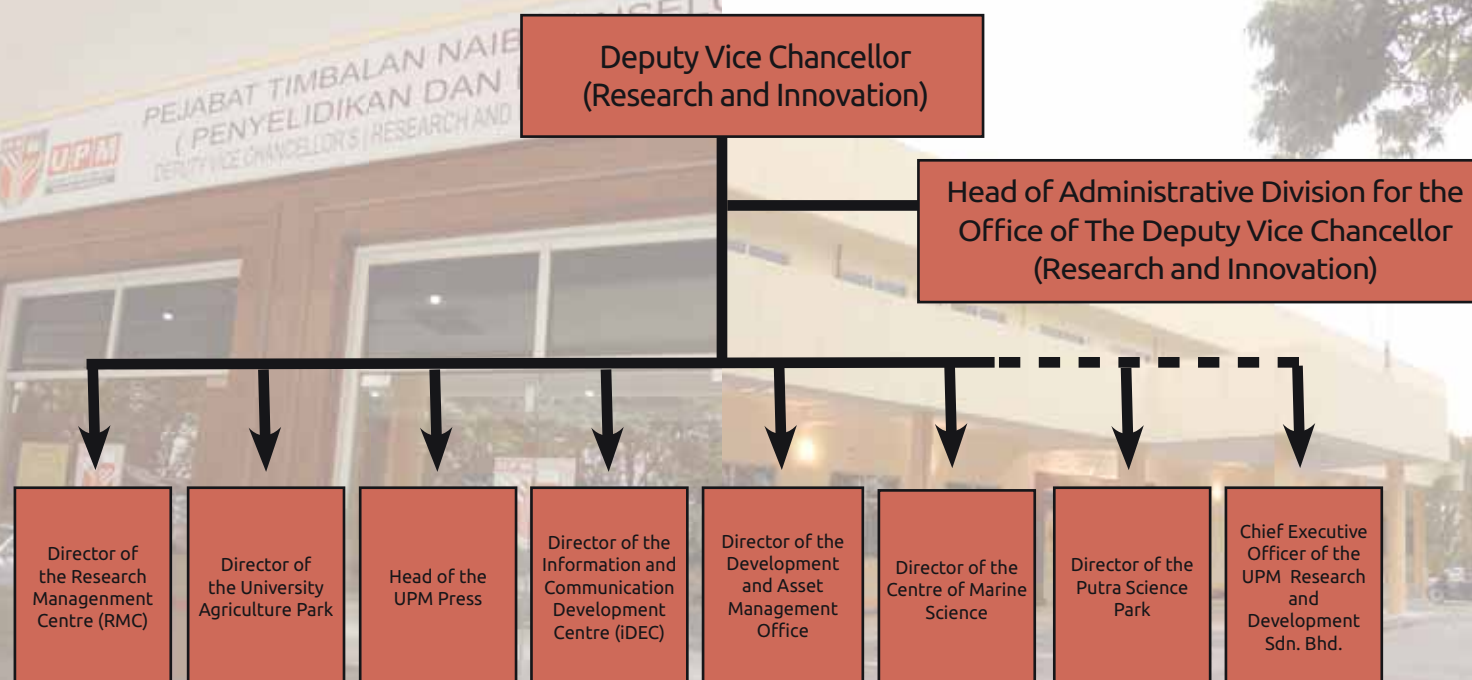
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# Office of The Deputy Vice Chancellor (Research and Innovation)



Development and Asset Management Office	Centre of Marine Science	UPM Innovations Sdn. Bhd.
<p>The Development and Asset Management Office is divided into four main divisions which are Project Management, Facility Management Division, Asset Management as well as Administration and Finance. The office provides physical facilities and infrastructures, maintains buildings and facilities/infrastructures in the campus, provides technical expertise including the need to fulfill environmental standards, obtains financial resources for development projects and becomes UPM's property holder. Besides that, the office manages the maintenance of available physical facilities and infrastructures to ensure that they are in good condition to avoid interruption of operations in the university. The office is required to plan and prepare physical facilities and infrastructures including transportation plan to fulfill requirement of UPM development towards a "University of the MSC" that emphasizes on economic cost, shortest time period and the best layout and quality.</p>	<p>Universiti Putra Malaysia (UPM) initiated the Centre of Marine Studies in Port Dickson to provide infrastructures and facilities for teaching, research, training and professional services in the field of marine science and mariculture ecosystem management. The Centre focuses (i) Science Marine – oceanography, environmental marine pollution management, marine life sciences at the Strait of Malacca; (ii) Mariculture – marine biotechnology, aquatic, food biotechnology and marine bioscience and (iii) development of a national referential museum for fish, aquatic plants, molluscs and crustacean at the Strait of Malacca. The Centre is currently actively producing giant freshwater prawn post larvae for commercialization and research activities and also pure stock of selected algae for fish and prawn larval feed. With the constant changing of the marine ecosystems, the Centre hopes to create an understanding regarding the marine environment and awareness for the need to manage the marine ecosystems.</p>	<p>UPM Innovations Sdn. Bhd. is wholly owned by UPM Holdings Sdn. Bhd., a subsidiary company of Universiti Putra Malaysia (UPM). It has a special role to play with regard to technology transfer in which it is formed to act as a technology transfer office of UPM to generate income through commercialisation activities. It assists in shaping UPM's research and development collaboration with the industries. UPM Inno aims to identify potential licensing opportunities for intellectual property developed at UPM including patented ideas, copyright works and know-how or trade secrets. It values intellectual property for market value and business risk. This is where potential technologies are selected to be transferred to the market based on valuations. Besides that, UPM Inno is leaning towards forming Strategic Business Units (SBUs) to nurture new potential companies (pre-corporation) until the management teams are mature and gain enough experience to run their full blown companies.</p>



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Papers should be double-spaced 12 point type (Times New Roman fonts preferred). The first page should include the title of the article but no author information. Page 2 should repeat the title of the article together with the names and contact information of the corresponding author as well as all the other authors. Page 3 should contain the title of the paper and abstract only. Page 4 and subsequent pages to have the text - Acknowledgments - References - Tables - Legends to figures - Figures, etc.

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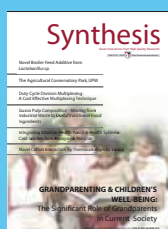
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**Research Highlight:** Grandparenting & Children's Well-being: The Significant Role of Grandparents in Current Society

### Regulars

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- Novel Cation Interaction by Thermoalkalophilic Lipase
- Duty Cycle Division Multiplexing: A Cost Effective Multiplexing Technique
- Novel Broiler Feed Additive from *Lactobacillus* sp.
- The Agricultural Conservatory Park, UPM

- Guava Pulp Composition – Moving from Industrial Waste to Useful Functional Food Ingredients

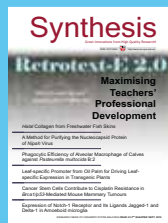
### R&D&C Happenings

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- Natural Gas Vehicle (NGV) Front Platform
- Agricultural Technology for Farmers
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- Expression of Notch-1 Receptor and Its Ligands Jagged-1 and Delta-1 in Amoeboid microglia
- Phagocytic Efficiency of Alveolar Macrophage of Calves against *Pasteurella multocida* B:2

- Halal Collagen from Freshwater Fish Skins
- Leaf-specific Promoter from Oil Palm for Driving Leaf-specific Expression in Transgenic Plants
- A Method for Purifying the Nucleocapsid Protein of *Nipah* Virus

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- UPM's Latest Products and Innovations
- Awarding Young Scientist in Shanghai

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- Magnesium Deficiency is Good for Magnesium Diboride
- Great Literary Works of the Malay Language by Raja Haji of Johor-Riau in the 19<sup>th</sup> Century
- Shortcut and Rapid Protocol of Isolating and Developing

- DNA Microsatellite Markers for Rivers Catfish
- Treatment of Oilfield Produced Water for Recycling and Beneficial Reuse
- Formulation of Tropical Lignocellulose *Kenaf* Fibre Compound for Malaysian Cars

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- New Solar Cell Materials from Ternary Chalcogenide Compounds
- Ruminants to Poultry: Beneficial Microbe and Gene

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- UPM Produces Low Sodium Salt

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- Effect of the Modification of Physicochemical Properties of ICAM-1-derived Peptides on the Internalisation and Intracellular Distribution in the Human Leukemic Cell Line

- HL-60
- An Adaptable Decentralised Business Process Execution Engine
- Transient Modelling Technique to Estimate Lightning Performance on Transmission Line
- Transition Inter-dispersed from Stratified in Water-oil Flows

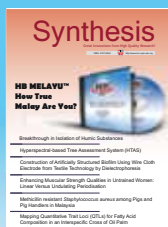
### R&D&C Happenings

- UPM Invention, Research & Innovation Exhibition in Reminiscences

### Reportage

- NewsBriefs

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### Editorial: Going Back to the Basics of ICT Services in UPM

**Research Highlight:** HB MELAYU™ - An Instrument to Measure Social Character Traits

### Regulars

- Mapping Quantitative Trait Loci (QTLs) for Fatty Acid Composition in an Interspecific Cross of Oil Palm
- Methicillin-resistant *Staphylococcus aureus* among Pigs and Pig Handlers in Malaysia
- Enhancing Muscular Strength Qualities in Untrained Women: Linear Versus Undulating Periodisation
- Breakthrough in the Isolation of Humic Substances

- Hyperspectral-based Tree Assessment System (HTAS)
- Construction of Artificially Structured Biofilm Using Wire Cloth Electrode from Textile Technology by Dielectrophoresis

### R&D&C Happenings

- International Conference and Exposition on Inventions of Institutions of Higher Learning: Towards an Innovation-driven Economy

### Reportage

- NewsBriefs

